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ABSTRACT

This paper discusses the amount of vocabulary required by students learning in a second language to comprehend academic texts, explaining that a wide vocabulary is essential for reading comprehension and for speaking and writing clearly. It highlights an assessment of the vocabulary levels of students entering Hong Kong University, which found that most incoming students had insufficient English vocabulary to read academic texts effectively. It describes a Web site developed to help students increase their vocabularies. The site allows students to work at their own pace, selecting their areas of need. It is based on materials written for an elective vocabulary building course held during a summer institute within the English department of the university. It allows students to view video clips, access sound and a customized glossary, assess their learning, check their progress, and participate in bulletin board discussions. Four sessions focus on psycholinguistic principles of vocabulary learning, pronunciation of new words, morphology, and guessing unfamiliar words from context. The paper describes the development of a resource for learners of economics and financial terminology and outlines a further computer-based research project that identifies types of tasks that are most effective in vocabulary learning. (Contains 19 references.) (SM)

English Vocabulary: tests and tasks

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Abstract

Studies show that native English speaking undergraduates are considered to have a vocabulary level of around 17,000 - 20,000 words (Goulden et al, 1990). Pilot studies at HKU suggest that many incoming students to this university have English vocabulary levels below 5,000 words; and some know fewer than 3,000.

Research has indicated that vocabulary learning is closely correlated with language competence, particularly reading performance (Laufer, 1997) and the ability to comprehend academic texts is a fundamental part of academic study. In an ideal world, taught courses could focus on developing students' vocabulary levels. There is, however, not enough time to include a substantial word learning component in English enhancement programs. It is simply not feasible to increase class time for English due to students' busy schedules with their other academic studies at tertiary level.

One solution is to take vocabulary learning out of the classroom and direct students to web based resources, specifically designed for Chinese learners of English at tertiary level. This project focuses on assessing the vocabulary levels of incoming students to Hong Kong and then identifying which types of tasks are most effective in on-line learning. Based on the research, a range of self-learning web based vocabulary materials is being developed to help learners increase their academic word level. Recommendations will be made regarding teaching academic and discipline-specific lexis and assisting students to increase their vocabulary in their own time and at their own pace.

Introduction

A frequent request from incoming tertiary students who are studying in a second or foreign language is for assistance in handling the reading of academic texts. While these students may have been good at dealing with secondary school textbooks, often their vocabulary is simply not up to coping with the heavier demands of texts produced by eminent scholars. Academic papers and textbooks are generally written for an audience of educated native speakers, rather than for second language learners. Students who are not native English speakers can find assignments that are required to be written in English a double challenge: comprehending the source and putting their ideas across concisely and accurately.

This paper first looks at the amount of vocabulary required by students learning in a second language to comprehend academic texts. Next it focuses on assessing the vocabulary levels of incoming students to Hong Kong University and describes a web site which was developed at this university to help students increase their word power. The paper then explains the development of a resource for learners of economics and financial terminology and finally outlines a further computer based research project that identifies types of tasks which are most effective in vocabulary learning. Based on this new study, an additional selection of self-learning web based vocabulary materials will be developed to help learners increase their academic word level.

Vocabulary size and reading ability

Many researchers agree that a wide vocabulary is an essential aid for reading comprehension. (See for example Carter 1987; Carter and McCarthy, 1988; Coady, 1997; Laufer, 1997; Nation 1990; Schmitt and McCarthy, 1997). Not only is a wide vocabulary essential for reading, but it is also fundamental for students to be able to express themselves both orally and in writing in a clear and concise manner.

Research has been conducted to attempt to quantify the learning load faced by tertiary level students. The average vocabulary size of native English speaking university graduates in Goulden, Nation and Read's (1990) study was shown to be around 17,000 - 20,000 base words. Many adult second language learners who spend years studying the language do not achieve near native vocabulary levels, and while it is a possible goal, few attain it. It could, however, be argued that most L2 students only need to know the words related to their academic studies.

What then is the minimum number of words required by second language students studying at tertiary level? Laufer (1988, 1991) argues that students need around 3,000 word families to enable them to comprehend 95% of an academic text. A word family means the base word and all its inflected and derived forms (eg walk, walks, walking, walked, walker) which increases the total number of words to around 5,000 lexical items.

Nation and Coady (1988) claim that readers need to know around 98% of the lexical items in a text in order to successfully guess the meanings of unknown words from the context. Many ESL students entering tertiary institutions require a substantial vocabulary expansion program to enable them to comprehend academic texts.

Several measurement scales exist for quantifying the depth and breadth of a learner's vocabulary and these are based on different corpora of texts. Two in particular will be discussed in this study. Coxhead's, (1998) Academic Word List (AWL) has been drawn up from a wide range of academic disciplines such as arts, science and law texts, but from which only the 2,000 most frequently used English words has been removed. This effectively means that the words on the list are of a fairly high frequency level and the list is considered to contain the bare minimum vocabulary of a general academic nature that a learner needs to know for tertiary study.

Xue and Nation's (1984) University Word List (UWL) of around 800 academic words is culled from a similar corpus of texts. These academic words account for approximately 8% of the words in an average university text and are particularly useful for upper secondary and tertiary students in English medium institutions. The list excludes the 5,000 most frequently used English words - on the assumption that they will already be known - and could be considered essential for reading comprehension at tertiary level (See Laufer, 1992; Nation, 1990; Read 1988 and Belgar and Hunt, 1999).

Based on frequency levels, it can be concluded that the AWL is level one and the UWL a more advanced, and arguably a more realistic level to achieve if a student is to be able to comprehend academic texts without the need for constant checking of meanings in a dictionary.

Assessing the vocabulary levels of incoming students

In order to ascertain the vocabulary levels of freshmen to Hong Kong University, two tests were conducted. A test was devised based on the AWL and administered to over 1200 first year students in September 1999. The mean score by faculty is shown in Table 1.

Table 1. Mean score in pre course test of academic vocabulary by faculty

Faculty	n	mean	SD
Engineering	448	77%	8.13
Arts	388	84%	6.25
Social Science	227	84%	5.7
Education	123	86%	5.3
Economics	49	84%	4.7
BBA	36	88%	5.2
Total	1271	83%	3.58

Students from the Business School achieved the highest scores, knowing 88% of the words on the Academic Word List, while the engineers trailed behind at 77%. While this may seem a reasonable score, it should be remembered that this test covers only the 550 most basic academic words above the 2,000 word level and that research suggests that the 5,000 word level is required in order to be able to comprehend texts. A further sample of 111 students from Dentistry, BBA and Economics were given vocabulary tests at the more advanced University Word Level and they knew only 56% of the words. The data show that most of our incoming students do not have sufficient English vocabulary to read academic texts effectively. Measures need to be taken to help these learners to increase their academic vocabulary thereby improving not only their reading skills but also their academic writing and their confidence in speaking in tutorials.

A contentious issue in teaching vocabulary is whether words are best learned incidentally, through reading, or if they should be subjected to intentional learning through word lists and dictionary checks, for example. Incidental vocabulary is learned as a by-product of another activity, without the learner's conscious decision, or intention, to learn the words. Krashen (1989) claims that students will learn all the words they need to know by reading extensively. According to his Input

Hypothesis, successful language learning is a result of comprehensible input combined with a powerful internal language acquisition device. It should be noted, however, that only three of the 144 studies cited to support his argument are based on second language learners. For long term retention of a large amount of vocabulary, learners must make a conscious effort and *intend* to learn the new words. Cognitive psychologists and language acquisition researchers working within the framework of cognitive psychology believe that retention of information is determined by the way the information is processed and that *intentional* learning is most effective. Bereiter (forthcoming) argues that students should be producing conceptual artifacts that help them understand the world - which in this case is learning words to help them understand the texts. The learners need to have a purpose and goal if they are to succeed in their learning.

Based on empirical evidence, the aim of the vocabulary course is to encourage intentional learning strategies, promote interaction with the newly encountered words and increase their long term retention. Given the number of discipline-specific courses that students are required to follow, there is usually only a limited amount of time left for enhancing language proficiency. English language courses often focus on academic reading and writing skills, with an emphasis on grammatical accuracy. There is usually insufficient time in class to work on academic vocabulary - an essential stepping-stone to comprehension, brevity and clarity.

Increasing vocabulary by web based learning

One solution is to take vocabulary learning out of the classroom and encourage those students who need to develop their university word skills, to work autonomously at their own pace and in their own time, selecting the areas in which they most need to improve. With the push towards greater integration of online courses with multimedia components, the web is rapidly becoming an ideal setting for independent learning that involves video demonstrations, sound and animated graphics. Coincidentally, the IT initiative at the University of Hong Kong requires all students to have their own computers and most opt to buy heavily subsidized notebook computers, allowing network access on and off campus. To complement this initiative, 'Words on the Web', a vocabulary learning site, has been produced to help incoming students assess their vocabulary level and then work on increasing their word power. Vocabulary learning strategies are explained and students are encouraged to learn the pronunciation of words, as well as their meanings and usage. As with CSILE (Computer Supported Intentional Learning Environments), it is designed to help learners achieve greater vocabulary learning goals by providing supports for thinking about words and understanding their meanings.

'Words on the Web' is based on materials written for an elective vocabulary building course run as part of the Summer Institute of the English Centre at the University of Hong Kong. The course annually attracts around 100 students. The materials were prepared with copious teachers' notes explaining psycholinguistic theory and suggestions for in-class 'experiments' to illustrate how words are stored in the mind. Many of the tasks involve eliciting words in group or pair work. Unfamiliar words are presented orally and grouped together on a whiteboard with links illustrating

word associations. Student handouts are more task related than theoretical and the focus is very much on intentional learning. The challenge was to rewrite the course to make it easily comprehensible without teacher fronted input, yet interactive, motivating and instructive.

The web authoring tool chosen had to include the pronunciation of words by native speakers (as opposed to computer-generated pronunciation), video recordings of teachers enunciating the sounds represented by phonemic symbols, a glossary with translation and a search feature to allow students to find specific words or sections. In addition, it was considered essential to allow students to take online tasks or exercises with automatic feedback for incorrect responses. For assessment purposes, a log was also required from which students could assess their progress and compare their performance with that of their peers. For research and pedagogical purposes, it was desirable to keep a record of student work that would be available to teachers who wanted to track student performance and identify problem areas.

In early 1998, when Words on the Web was in its infancy, Web Course Tools (WebCT) had just been licensed to the University of Hong Kong. Its features that allow students to view video clips, access sound and a customised glossary, assess their learning, check their progress and take part in bulletin board discussions, all seemed highly useful and relevant to this particular kind of course. Figure 1 shows the opening screen of a typical WebCT course showing the icons which represent the key features of the course.

Figure 1: Icons represent the key features of the course

Words on the Web

This course is designed for students who wish to learn
how to increase their English vocabulary.

Click on the Contents icon below to begin. Have fun!



contents



glossary



information
information



resume session



quiz



search



compile



bulletins



my record



my progress



mail

To Instructor



LRC references

Course description

On entering the course, students are required to input their student ID and password so that a record can be kept of their progress in the database. Students are then invited to take online 'quizzes' based on the University Word List vocabulary levels tests which enable students to assess their

Session one focuses on basic psycholinguistic principles of vocabulary learning and how we store words in our mind. Short interactive tasks are included for students to test themselves on recalling words by sight and by sound. Many Chinese students of English recall words by sight (or spelling) and have considerable difficulty in pronouncing an unfamiliar word. Another frequent problem area is in separating words which have similar spelling and pronunciation, but different meanings. An example illustrated in Figure 2 is the often confused *compliment*, *complement* and *complementary*.

Words which cause Confusion

SOME WORDS CAUSE CONFUSION BECAUSE THEY LOOK VERY SIMILAR TO OTHER WORDS YOU HAVE LEARNED. Perhaps they sound the same but have different spellings and different meanings. Maybe you know one meaning of a word which has several meanings. Sometimes it can help to separate confusing words by visually linking words and their meanings.

e.g.	compliment complimentary complement		c o m n p l e m e n t
search	a d m		
bulleting	m g l		
me before	compl i ment compl i mentary compl e ment		
	r f t		
	e l s		

The word **complement** appeared in the 5,000 word level quiz and means an expression of admiration. It can also be used as a verb to admire. Try linking the two words visually so that you associate them two meanings.

The word **complement** sounds the same and has very similar spelling, but means anything that completes a group, a set or a number, e.g. We need two more officers and ten more crew to bring the ship to its full complement, or as a verb to make complete.

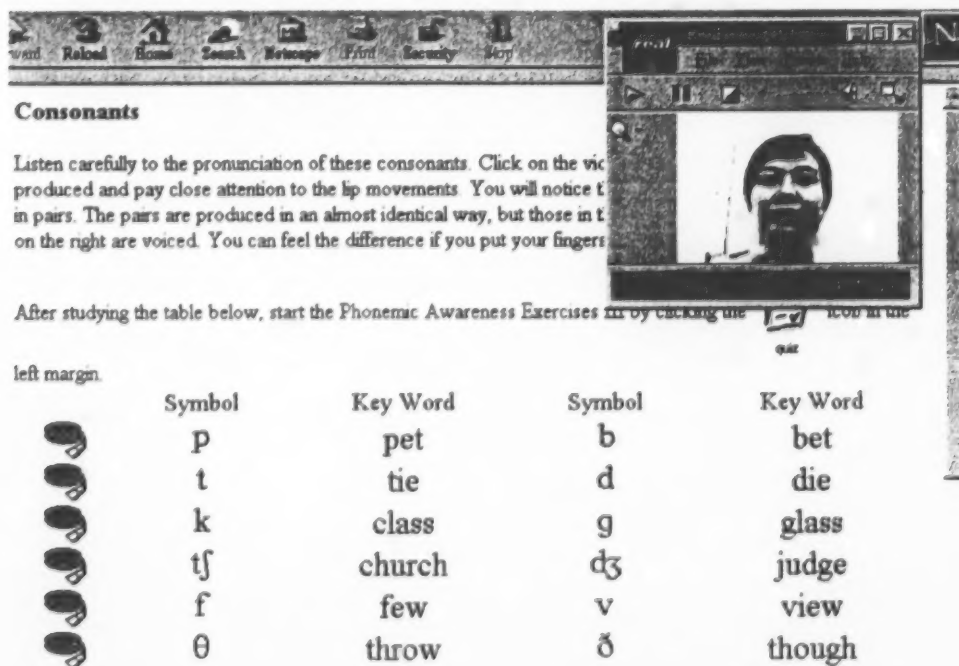
Complimentary is an adjective which means expressing a compliment or given free of charge. If someone gives you complimentary tickets to a show, they are a gift!

Can you think of ways of distinguishing between principle and principal? Do It!

And between council and counsel? Do It!

The next session further develops this important and often neglected aspect of English vocabulary learning: the pronunciation of newly learned words. To take advantage of the multimedia capabilities of the web, sound and video have been incorporated into the course to enable learners to hear the pronunciation of words. Short video clips are used to help students develop an awareness of the sounds represented by phonemic symbols shown in their dictionaries. Both male and female voices are included featuring American and English accents recorded by teachers in the English Centre. This is not a case of learning phonics as subject matter, which is criticised in Bereiter (forthcoming); rather it is training Chinese speaking learners the importance of attaching both sound and written form to the meaning of newly learned words so that they are stored more effectively in the mental lexicon.

Figure 2: Example of video demonstration of phonemic symbols



Consonants

Listen carefully to the pronunciation of these consonants. Click on the video produced and pay close attention to the lip movements. You will notice that they are produced in pairs. The pairs are produced in an almost identical way, but those in the left column are voiceless and those in the right column are voiced. You can feel the difference if you put your fingers on your throat.

After studying the table below, start the Phonemic Awareness Exercises by clicking the icon in the left margin.

Symbol	Key Word	Symbol	Key Word
p	pet	b	bet
t	tie	d	die
k	class	g	glass
tʃ	church	dʒ	judge
f	few	v	view
θ	throw	ð	though

Session three deals with word associations and the use of a thesaurus. The aim here is for learners to note that certain words can only be used in particular contexts and while words may have similar meanings, such as *slip* and *skid*, they are not interchangeable: a young child does not usually *skid* accidentally on the floor.

A further feature is morphology: by breaking a word down into its component parts and understanding them, learners may have a better chance of guessing the overall meaning of a word from the context. *Terminate* is used as an example to elicit words which contain a familiar root. Learners frequently recognise the root 'termin' as being used in other words such as 'terminus', 'terminal' and in the movie 'Exterminator'. By linking together words with a similar root, they can often think more deeply about the words themselves and see the common features and overlaps of meaning with the shared concept of 'end'. The additional effort made to identify semantic links in words and the relationship between parts of words and their use in a sentence, (see Figure 3) helps students to manipulate words more easily and use the correct form appropriately.

Figure 3: Example of web page showing the relationship between suffix and part of speech

Suffix: -ate Words with this suffix are **often verbs**

substantiate
evaluate
dominate
affiliate
educate
abdicate
infatuate
infuriate
pontificate

suffocate
resonate
fluctuate
abbreviate
integrate
narrate
investigate
operate
initiate

mutate
dictate
congratulate
adjudicate
insinuate
elevate
hesitate
administrate

Examples of words with various prefixes or suffixes are provided, and by clicking on the hyperlinks, students can check the meanings of unfamiliar items in the glossary together with the translation in Chinese characters and an example of how the word can be used in a sentence. Other forms of the word are also provided, such as adjectives, adverbs and irregular past tenses.

Close

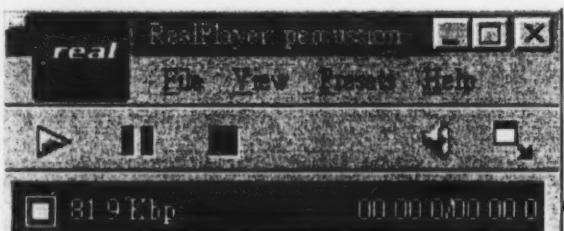
Back

Forward

Glossary Definition: percussion

1. the forceful striking together of two (usually hard) objects.
敲打, 叩擊
2. musical instruments that are played by being struck, exp.
as a division of a band.

敲擊樂器組 



The last session then focuses on guessing unfamiliar words from context and provides some short texts on which students can test their skills. A few examples of idioms and phrasal verbs (such as *make up*, *make out* and *make off with*) are also included with more quizzes for practice.

As the course and site develops more examples and exercises will be added to provide a much wider selection of words. Currently in preparation are crossword puzzles, word searches and

listening exercises to make the learning process more interesting and interactive - but some tasks may promote better learning than others.

Which tasks promote long term retention of words?

A new, related site is being developed based on further research. During a series of one-to-one tutorials, 106 students took part in an experiment to find out whether there is a relationship between the learning task and the long term recall of unfamiliar words. While the data have not yet been fully analysed, a pattern is emerging that, contrary to Krashen's Input hypothesis, the conventional comprehension task does not necessarily promote vocabulary learning. Students frequently make incorrect guesses and do not bother to verify their answers in the on-line dictionary. Tasks that require greater involvement with words, such as selecting the correct word to fill a gap in a sentence, result in better long term recall.

Future developments - subject specific sites

Following on from the vocabulary tests administered to freshmen in September 1999, a new element was included in the English course for Economics and Finance first year students. They are required to follow a current economics topic of their choice in newspapers and journals for the duration of the course. In addition to reading the texts, analysing and synthesising the relevant content into a 1500 word report, students were also asked to keep a note of the economics-related words that they encountered in their reading and to hand in lists showing the words and their meanings. This list of words gathered from economics and finance related articles is being collated

and each item will be put into an on-line glossary together with its pronunciation, English definition, Chinese meaning and an example of its use in context. The words will then be selected for incorporation into interactive tasks - based on the findings of the 'task type and recall' research findings.

Implications for vocabulary teaching at university

Students who are studying in an English medium university and particularly those who are not native English speakers require a wide vocabulary to read and understand academic texts. Most such students do not have sufficient range in their English vocabulary to allow them to study effectively and efficiently. Additional help is required if they are to comprehend their texts and lectures fully, and write and speak clearly and concisely.

Most vocabulary enhancement for students at this level of proficiency can be tackled through independent learning. Students can be helped to work autonomously and develop their own strategies for vocabulary enrichment. But need this involve technology?

Simply putting materials on the web is not the answer to learning problems. For many students books are equally convenient and accessible. However, the web can excel as an *interactive* medium to present information in a more clearly comprehensible format such as video presentations, audio files and animated graphics. Students can be *involved* more closely in the learning process, choosing the words that they most need to learn and selecting the kinds of tasks

that help them remember the meanings and use the words appropriately. They can *hear* the words as they learn them. With instant feedback in exercises and a record of their progress, motivation can be improved and students may be stimulated to keep going in what is often the duller and most boring of learning activities.

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